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On the Electric Powers and Sex Ratios of Foetal *Narcine brasiliensis* (Olfers).

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Although the small electric rays of the West Indies and Florida, *Narcine brasiliensis* (Olfers), are reasonably well known and recorded as giving electric shocks of some force, little seems to be known about their uterine embryos. Bean & Weed (1911) describe and figure the young of a 17-inch specimen which contained 14 foetuses and quote the reports of trammel-net fishermen along the Florida Keys regarding the electric powers of adults.

Trammel-net fishermen operate near the New York Aquarium's field station on Palmetto Key, which is in the vicinity of Boca Grande; see Breder (1939). They report that this ray is frequently taken in their gear. The shocking powers of these fish are sufficient to cause the operators to leave them in the trammel pockets when they clear their nets. Here they are left to die, being removed later when the fishermen reach home and spread their nets for drying.

One of these groups, the Spearing family, has been very kind in bringing interesting specimens to the laboratory. On July 8, 1940, they brought in a female *Narcine* of 295 mm. over all. It had aborted two premature young in their bucket and subsequently died. Manipulation caused it to extrude six more embryos. These were still in a living state and made the usual feeble efforts of ray embryos to swim. Nothing exceptional was noted in the manipulation incident to the extrusion, but when the young were handled four of them were noted to be capable of giving electric shocks. Although in a much weakened stage and not nearly ready to be born, this shock was sufficient to cause the senior writer to drop them, although this result was perhaps as much from surprise as from the current. The fine tingling sensation was typical of an interrupted or alternating current. The young were not all in a single stage of development. The range of their condition may be estimated by the following figures of length of embryo and diameter of yolks. The two largest, dead when received, and the two smallest, showed no reaction. Whether the two smallest had not yet developed the ability or whether they were so weakened as to be unable to discharge is not clear. The over-all lengths of the embryos were: male, 65, 67; female, 65, 73, 76, 78, 78 and 80 mm. The diameters of the yolks, respectively, were: 16, 14, 5, 6, 7, 8, 9 and 7 mm. The smallest female was abnormal in that the yolk sac appeared deflated and the ventral fins were slightly asymmetrical.

One of us, Springer, handling similar material, detected no electric effects from the young, but in this case the operator is particularly insensitive to electric shocks, while on the contrary the other one of us is more than usually sensitive to such effects. In addition, moreover, Mr. L. A. Krumholz, working at the same place with the latter, also felt the discharge.

The prenatal development of this ability to give off electric shocks suggests interesting complications in the internal circuits of the mother and young and causes one to wonder what the characteristics of the exterior total current might be like. Also the question of why no discharge was felt while the young were being forced out is of note. Suppression of or impossibility of discharge before birth, insulating or dissipating qualities in the parent, suggest themselves as possibilities.

The following data were taken from material obtained from a trammel-net at Punta Gorda Beach, July 7, 1939, giving total length and width in mm.

Males		Females			
T. L.	W.	Gravid		Non-gravid	
T. L.	W.	T. L.	W.	T. L.	W.
300	160	310	173	375	308
295	164	284	165	271	152
228	124				
272	153				

The one gravid female of 310 mm. in length contained four males 82×50 , 79×42 , 81×43 , 81×43 , and one female 84×45 . The other of 284 mm. contained one male and three females of 78 to 80 mm. in length.

SEX RATIO OF EMBRYOS.

Length of Mother	Male	Female	% Male
284	1	3	25
295	2	6	25
310	4	1	80
432	9	5	64
	—	—	—
	16	15	52

It is apparent that while there seems to be a tendency for the young to be predominantly of one sex in a given female, the young from so few as four females taken at widely separated times and places, when combined, closely approximate a 1-to-1 ratio. It would also appear that small mothers tend to produce more females while the large tend to a preponderance of male offspring, although of course, these specimens are too few for a basis of generalization.

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